SPIN TRAPPING THE OXIDIZED PRODUCTS OF PUFA IN MODEL MEMBRANES: THE PROTECTION CONFERRED BY VITAMIN E.

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Electron paramagnetic resonance (EPR) spectroscopy is recognized as the most sensitive and noninvasive means to quantify free radicals of biological relevance such as reactive oxygen species (ROS). In spin trapping a molecule (the spin trap) reacts with the free radical producing a spin adduct that is sufficiently stable to be detected by EPR. Here we apply a novel spin trapping technique to investigate the protection that α-tocopherol (vitamin E), the major lipid soluble antioxidant in membranes, confers on polyunsaturated lipids in model membranes. Polyunsaturated fatty acids (PUFA) readily oxidize because they have a *cis,cis*-1,4-pentadiene motif that renders the central methylene group vulnerable to attack by ROS. Our method quantifies the oxidized products of PUFA in lipid vesicles that have been exposed to a peroxyl radical generator 2,2'-azobis-(amidinopropane) dihydrochloride (AAPH) that initiates the free radical chain reaction. By measuring the reduction in lipid peroxidation due to the presence of α-tocopherol, we test the hypothesis that the vitamin co-localizes with polyunsaturated lipids in membrane domains to ensure close proximity to the most vulnerable lipid species.